

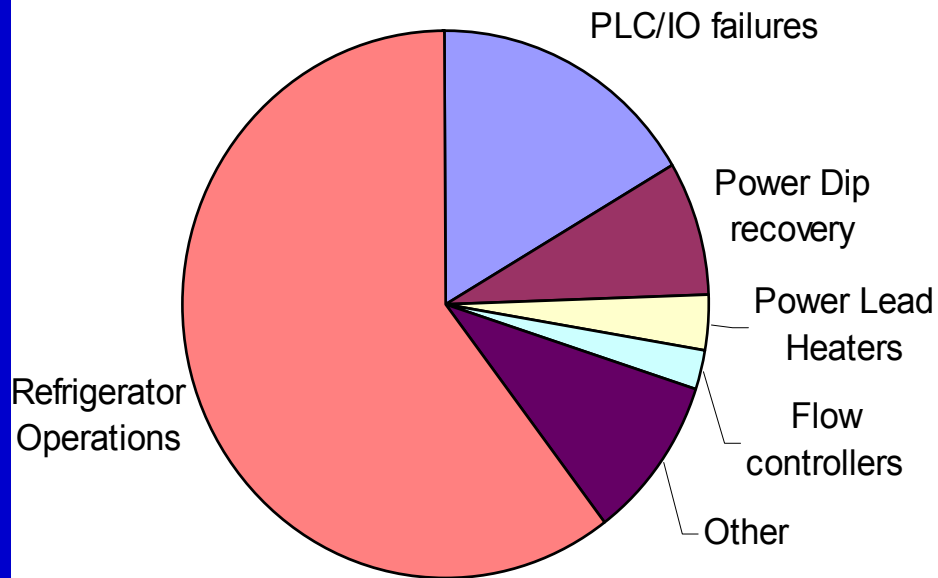


# CRYOGENIC OPERATIONS

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Tony Nicoletti  
March 6, 2002

# FAILURE HOUR BREAKDOWN



- Does not include insulating vacuum problems which delayed cooldown.



# ADDRESSING THE ISSUES

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- Valve Box Insulating Vacuums
  - Replace defective valve casings at 6 o'clock Blue and Yellow Valve boxes.
    - Replace all that have not been replaced already
      - 75 valve casings
    - Eliminate corroded welds that degraded insulating vacuum



# REFRIGERATOR OPERATIONS

- Burst Disk Switchable Valve
  - Isolate a burst disk for replacement while simultaneously bringing another on-line.
- Fiber Optic cable for communications between cryo control and refrigerator, compressor room.
- Upgrade CRISP I/O system
  - Improved control features
  - Improved security features
- Refrigerator Temperature Instrumentation
  - Easier to replace sensors
  - Allows for expansion
- Refrigerator Vacuum Instrumentation

# Cryo Turbo Expanders

- Turbine refurbishing
- Adding heater to warm up turbines
- Turbine skid refurbishing
- Adding pressure instrumentation to help diagnose problems
  - Precursor to instrumentation overhaul





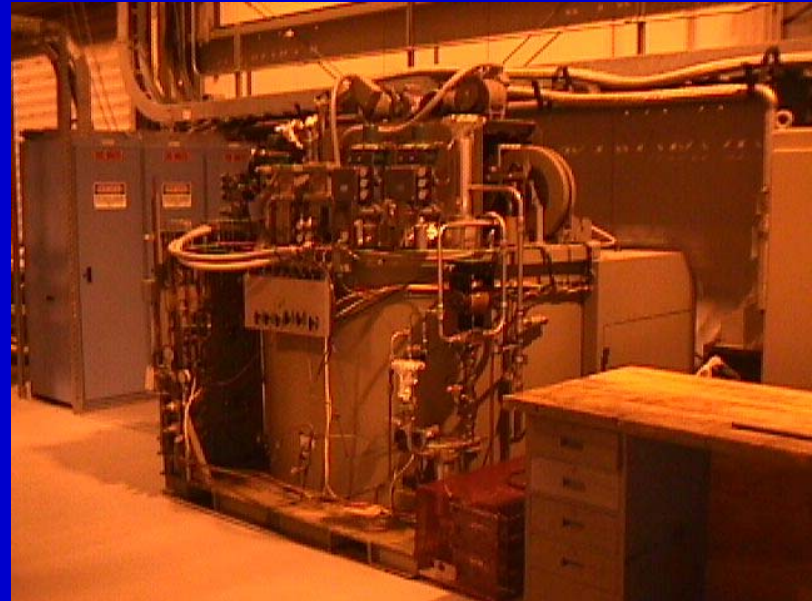
# RING ELECTRICAL

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- Moving I/O racks at 9Q3, 9Q6, 10Q3, 10Q6 to 10:00 service building
- Power Lead Heaters
  - Failure alarms on CQS lead Heaters
  - Redesign of Snake Lead Heaters

# 2002 UPGRADES

- Helium Reliquefier at 1006B
  - Maintain Liquid Helium Dewars cold during shutdowns
  - Can hold approximately 3 million scf of Helium
  - With additional warm tanks, this eliminates the need for off site storage
  - Completed this calendar year



# WARM HELIUM STORAGE TANKS

- Eventual capacity to store 3.8 million scf of warm Helium
- With the Helium liquefier operational, the entire inventory can be stored on site during RHIC shutdowns







# NITROGEN PRECOOLER

- Maintain the ring at 80-100K during shutdowns
- Reduce cooldown time by 2 weeks
- Keep the system free of contaminants
- Eliminate stresses associated with thermal cycling
- Due on site in December, 2002. Available for next RHIC shutdown



# FUTURE UPGRADES

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- TURBINE SKID I/O
  - Replace pneumatic system with electronic control.
  - Integrate into process control system
  - Improved problem diagnosis and troubleshooting
- COMPRESSOR ROOM I/O
  - Integrate into process control system
  - Improved problem diagnosis and troubleshooting
- Become aware of problems before they shut equipment off.